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IS : 12260 - 1987
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(Reaffirmed 2003)

Indian Standard

METHOD FOR RING EXPANDING TEST ON METALLIC TUBES

(ISO Title : Metallic Materials — Tube — Ring Expanding Test)

National Foreword

This Indian Standard, which is identical with ISO 8495-1986 'Metallic materials — Tube — Ring expanding test', issued by the International Organization for Standardization (ISO), was adopted by the Bureau of Indian Standards on the recommendation of the Methods of Physical Tests Sectional Committee and approval of the Structural and Metals Division Council.

Wherever the words 'International Standard' appear, referring to this standard, they should be read as 'Indian Standard'.

Methods of Physical Tests Sectional Committee, SMDC 3 [Ref : Doc : SMDC 3 (3175)]

Adopted 25 November 1987

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1 Scope and field of application

This International Standard specifies a method for a ring expanding test on tubes, that is used to reveal surface and internal defects in the tubes by expanding the test piece using a drift until fracture occurs. It may also be used to assess the plastic formability of tubes.

The ring expanding test is applicable to tubes having an outside diameter from 18 up to and including 150 mm and wall thickness from 2 up to and including 16 mm.

2 Principle

Expanding a ring cut from the end of a tube, over a conical mandrel until fracture, or until the expansion of the test piece reaches a value specified in the relevant standard.

3 Symbols, designations and units

Symbols, designations and units used for the ring expanding test are given in the table and the figure.

Table — Symbols, designations and units

Symbol	Designation	Unit
D	Original outside diameter of the tube	mm
a	Wall thickness of the tube	mm
D_u	Maximum outside diameter of the expanded part of the test piece	mm
L	Length of the test piece before the test	mm
D_m max.	Maximum diameter of the mandrel	mm
D_m min.	Minimum diameter of the mandrel	mm

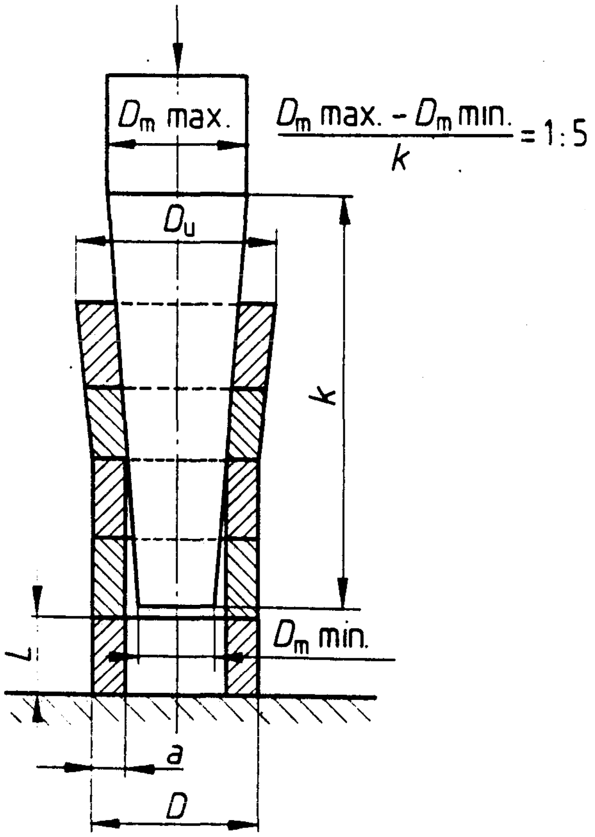

Figure — Symbols for ring expanding test

4 Testing equipment

4.1 The test shall be carried out in variable-speed presses or universal testing machines.

4.2 The working length of the conical mandrel shall have a taper of its diameter of preferably 1 : 5 and its surface shall be of sufficient hardness, well polished and free from scores.

5 Test piece

5.1 The length of the test piece shall be between 10 and 16 mm. Test pieces shall be taken from the ends of trimmed tubes as manufactured before they are cut to length. The rings shall be cut so that the planes of the end faces are parallel with each other and perpendicular to the axis of the tube.

5.2 The edges of the test piece may be rounded by filing.

5.3 When welded tubes are subjected to the test, the internal weld flash may be removed.

6 Procedure

6.1 In general, the test shall be carried out at ambient temperature within the limits of 10 to 35 °C. The test carried out under controlled conditions shall be made at a temperature of 23 ± 5 °C.

6.2 Before testing, the rings and the mandrel may be lubricated. Rings of the same size and the same type of metal may be placed one on top of each other. The rings and the mandrel shall be concentric (see the figure).

6.3 Force the conical mandrel into the rings until the required expansion is reached or the rings fracture.

6.4 The rate of penetration of the mandrel shall not exceed 30 mm/s.

6.5 The relative expansion shall be calculated in accordance with the relevant standard.

6.6 Interpretation of the ring expanding test shall be carried out according to the requirements of the relevant standard. When these requirements are not specified, absence of surface and internal defects visible without the use of magnifying aids shall be considered as evidence that the test piece passed the test.

7 Test report

The test report shall include at least the following information:

a) reference to this International Standard;

b) identification of the test piece,

c) dimensions of the test piece;

d) result of the test.

Reprography Unit, BIS, New Delhi, India